

(107)**Models for UT Inspection of Bolthole Cracks in Layered Structures**

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Due to the geometrical complexities of bolted, layered airframe structures, the application of Model Assisted Probability of Detection, or MAPOD, is an important tool for helping to assess the ultrasonic inspectability of those components. Of particular importance is the need to inspect for cracks on or near boltholes in those structures. This presentation describes the development and testing of analytical computer models of and their application to bolthole crack inspection. The modeling approach includes approximate, paraxial, bulk-wave models as well as more rigorous, analytical models that include both bulk and surface/plate modes. The simpler models have the flexibility and computational efficiency to handle complex geometries and structures. The more exact, rigorous models apply to simpler, canonical geometries for use in benchmarking and assessing the accuracy of the paraxial models. Previous model results for single layers will be reviewed and application of the models to multiple layers will be highlighted. Extensions of the models to more complex geometries and materials, computational challenges to future model development, and applications of the models to MAPOD, and will also be addressed.

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